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TRANSACTIONS

OF THE

KANSAS

ACADEMY OF SCIENCE

VOLUME XXVI.

CONTAINS

LIST OF OFFICERS AND PAST PRESIDENTS; MEMBERSHIP
LIST JANUARY 1, 1914; MINUTES OF FORTY-SIXTH
ANNUAL MEETING; PRESIDENT'S ADDRESS;
SOME PAPERS READ.

December 23 and 24, 1913.

KANSAS STATE PRINTING OFFICE.
W. C. AUSTIN, State Printer.
TOPEKA. 1914.
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OFFICERS OF THE ACADEMY, 1914.

| | |
|---|------------|
| <i>President</i> , W. A. HARSHBARGER..... | Topeka. |
| <i>Vice President</i> , J. A. G. SHIRK..... | Pittsburg. |
| <i>Vice President</i> , J. E. TODD..... | Lawrence. |
| <i>Treasurer</i> , L. D. HAVENHILL..... | Lawrence. |
| <i>Secretary</i> , J. T. LOVEWELL..... | Topeka. |

EXECUTIVE COUNCIL.

Ex officio the PRESIDENT, TREASURER and SECRETARY.

Elective for 1914.

| | |
|------------------|----------------|
| E. H. S. BAILEY. | L. C. WOOSTER. |
| F. B. DAINS. | J. T. WILLARD. |

MEMBERSHIP OF THE ACADEMY.

January 1, 1914.

Dates signify date of election to membership in the Academy.

HONORARY MEMBERS.

G. P. Grimsley, Ph. D., 1904, Martinsburg, W. Va.
Edw. L. Nichols, Ph. D., 1897, Cornell Univ., Ithaca, N. Y.
W. S. Franklin, Sc. D., Lehigh Univ., South Bethlehem, Pa.
Geo. Wagner, Ph. D., 1904, Univ. of Wisconsin, Madison, Wis.
S. W. Williston, A. M., M. D., Ph. D., 1902, professor of paleontology,
Univ. of Chicago, Chicago, Ill.

ASSOCIATE MEMBER.

Mrs. R. J. Brown, 1903, Leavenworth.

LIFE MEMBERS.

E. H. S. Bailey, Ph. D., 1883, Univ. of Kansas, Lawrence.
Edward Bartow, Ph. D., 1898, director of water survey, Urbana, Ill.
Joshua William Beede, Ph. D., 1894, associate professor of geology,
Bloomington, Ind.
F. W. Bushong, Sc. D., 1896, Mellon Institute, Univ. of Pittsburgh, Pa.
F. W. Cragin, Ph. D., 1880, economic, geologic and historical research,
Colorado Springs, Colo.
Lewis Lindsay Dyche, M. S., 1881, professor of systematic zoölogy and
curator of birds, mammals and fishes, state fish and game warden,
Univ. of Kansas, Lawrence.
Geo. H. Failyer, M. Sc., 1879, Manhattan.
E. C. Franklin, Ph. D., 1884, Stanford Univ., Palo Alto, Cal.
I. D. Graham, 1879, Live Stock Com., Panama Ex., San Francisco, Cal.

Wm. Ashbrook Harshbarger, B. S., 1900, professor of mathematics, Washburn Coll., Topeka.
 Erasmus Haworth, Ph. D., 1882, state geologist, Univ. of Kansas, Lawrence.
 Warren Knaus, M. Sc., 1884, entomologist, editor and publisher, McPherson.
 D. E. Lantz, M. Sc., 1887, biological survey, Washington, D. C.
 J. T. Lovewell, Ph. D., 1878, chemist, Topeka.
 F. O. Marvin, A. M., 1884, Univ. of Kansas, Lawrence.
 Ephraim Miller, A. B., A. M., Ph. D., 1873, Pasadena, Cal.
 *E. A. Popenoe, A. M., 1872, entomologist, Topeka.
 L. E. Sayre, Ph. M., 1885, Univ. of Kansas, Lawrence.
 Alva J. Smith, 1903, city engineer, Emporia.
 *B. B. Smyth, 1880, curator Goss Ornithological Collection, Topeka.
 Mrs. L. C. R. Smyth, M. S., Ph. D., 1902, curator of Goss Ornithological Collection, Topeka.
 E. G. Smyth, 1901, entomology, Santa Rita, P. R.
 C. H. Sternberg, 1896, explorer and collector, Lawrence.
 *A. H. Thompson, D. D. S., 1873, Topeka.
 M. L. Ward, D. D., 1880, Ottawa Univ., Ottawa.
 J. T. Willard, M. S., 1883, Kansas Agr. Coll., Manhattan.

ANNUAL MEMBERS.

Frank G. Agrelius, A. M., 1905, State Normal School, Emporia.
 Bennet M. Allen, 1913, professor of zoölogy, Lawrence.
 H. C. Allen, 1904, Univ. of Kansas, Lawrence.
 Agnes Anderson, 1913, chemist.
 John J. Arthur, 1904, Topeka.
 Wm. R. Arthur, B. A., 1903, dean of law school, Washburn Coll., Topeka.
 W. M. Bailey, 1906, teacher, Holton.
 Elam Bartholemew, M. S., 1905, mycologist, Stockton.
 W. J. Baumgartner, 1904, professor of zoölogy and histology, Univ. of Kansas, Lawrence.
 Frank G. Bedell, 1904, Dodge City.
 F. H. Billings, Ph. D., 1909, Univ. of Kansas, Lawrence.
 Julius Brandt, 1907, Bethany Coll., Lindsborg.
 H. H. Braucher, 1907, teacher, K. S. N., Emporia.
 Frank P. Brock, 1911, Ind. research, Univ. of Kansas, Lawrence.
 E. W. Brown, B. S., 1909, Chehalis, Wash.
 Edw. Bumgardner, M. D., Univ. of Kansas, Lawrence.
 L. D. Bushnell, 1909, professor of bacteriology, Agr. Coll., Manhattan.
 H. P. Cady, Ph. D., 1904, professor chemistry, Univ. of Kansas, Lawrence.
 M. E. Canty, 1903, Buffalo, Kan.
 I. D. Cardiff, Ph. D., 1909, professor of botany, State Agr. Coll., Pullman, Wash.
 V. B. Caris, 1911, professor mathematics, M. T. S., Pittsburg.
 F. P. Clark, M. D., 1909, Univ. Hospital, Kansas City, Kan.
 W. A. Cook, M. S., 1907, Baker Univ., Baldwin.
 R. A. Cooley, 1910, Ag. Expt. Station, Bozeman, Mont.

* Deceased.

Rev. John T. Copley, 1903, clergyman, Manhattan.
E. G. Corwine, 1905, Mulvane.
E. F. Crevecoeur, 1899, entomologist, Onaga.
S. J. Crumbine, M. D., 1909, secretary State Board of Health, Topeka.
Frank Burnett Dains, Ph. D., 1902, professor of chemistry, Univ. of Kansas, Lawrence.
B. J. Dalton, C. E., 1909, Univ. of Kansas, Lawrence.
Geo. A. Dean, M. S., 1912, professor of entomology, Manhattan.
O. P. Dellinger, professor of biology, M. T. S., Pittsburg.
S. A. Deel, 1913, professor of physics, Baker Univ., Baldwin.
Emil O. Deere, 1905, Bethany Coll., Lindsborg.
*Robt. K. Duncan, B. A., 1906, professor of industrial chemistry, Univ. of Pittsburg, Grand Boulevard, Pittsburg, Pa.
R. B. Dunlevy, M. A., 1896, S. W. Kansas Coll., Winfield.
E. H. Dunmire, B. S., 1895, Lawrence.
J. W. Eby, 1903, banker, Harvard.
C. W. Edmondson, Ph. D., 1909, professor of geology and histology, Eugene, Ore.
H. W. Emerson, B. S., 1904, Univ. of Kansas, Lawrence.
B. F. Eyer, B. S., E. E., 1904, professor of electrical engineering, Manhattan.
T. L. Eyerly, 1906, high school, department of physiography, Dallas, Tex.
Fred. Faragher, A. B., 1904, with Alden Spear's Sons Co., Chicago, Ill.
A. O. Garrett, 1901, teacher high school, Salt Lake City, Utah.
Roy W. Gragg, 1907, accountant, Bartlesville, Okla.
A. A. Graham, 1910, lawyer, Topeka.
O. S. Groner, Sc. M., 1907, professor of chemistry, Ottawa Univ., Ottawa.
Mary Herman, Ph. D., 1912, Agr. Coll., Manhattan.
H. J. Harnly, B. S., 1903, professor, McPherson Coll., McPherson.
L. D. Havenhill, D. Phar., 1904, professor of pharmaceutical chemistry, Univ. of Kansas, Lawrence.
Thomas J. Headlee, Ph. D., 1907, professor of zoölogy and entomology, Rutgers Coll., New Brunswick, N. J.
W. C. Hoad, B. S., 1904, Univ. of Kansas, Lawrence.
D. A. Horton, 1913, entomologist, McPherson.
W. F. Hoyt, A. M., 1902, State Normal School, Neb.
Albert K. Hubbard, Ph. D., 1904, Univ. of Kansas, Lawrence.
I. W. Humphrey, 1912, Mellon Institute, Univ. of Pittsburg, Pa.
Thomas M. Iden, 1897, State Normal School, Emporia.
H. Louis Jackson, B. S., 1909, state food analyst, Univ. of Kansas, Lawrence.
*John J. Jewett, 1902, physicist, San Diego, Cal.
A. W. Jones, B. S., 1894, Wesleyan Univ., Salina.
F. E. Jones, 1909, manual training school, Lawrence.
W. H. Keller, 1898, high school, Emporia.
H. H. King, A. B., A. M., 1909, asst. professor of chemistry, Agr. Coll., Manhattan.
Leslie A. Kenoyer, 1906, Independence.
Harry L. Kent, 1904, nature study, Agr. Coll., Manhattan.

* Deceased.

John H. Klopfer, 1904, collector and mining expert, Topeka.
Pierce Larkin, A. B., 1902, geology, Univ., Norman, Okla.
W. S. Long, 1913, food laboratory chemist, Lawrence.
R. D. Landrum, B. S., 1909, Lisk Manufacturing Co., Canandaigua, N. Y.
Marcus A. Low, 1906, attorney C. R. I. & P. railway, Topeka.
L. A. Lowther, 1907, superintendent of schools, Emporia.
R. Matthews, D. D. S., 1898, dental surgery, Wichita.
J. W. McCulloch, 1911, field agent, Agr. Coll., Manhattan.
David F. McFarland, Ph. D., State Univ., Urbana, Ill.
J. M. McWharf, M. D., 1902, physician, Ottawa.
Grace R. Meeker, 1899, botanist, Ottawa.
C. F. Menninger, M. D., 1903, physician, Topeka.
S. T. Millard, M. D., 1909, physician and surgeon, Topeka.
W. L. Moodie, 1906, State Normal, Bellingham, Wash.
Roy L. Moodie, Ph. D., 1909, instructor, Baylor Univ., Dallas, Tex.
Merle M. Moore, 1909, student, Ottawa Univ., Ottawa.
Celia Mulvehill, A. B., 1911, high school, Pittsburg.
R. K. Nabour, 1910, instructor in zoölogy, Agr. Coll., Manhattan.
C. A. Nash, 1907, Univ. of Cincinnati, Ohio.
C. F. Nelson, 1913, chemist, Lawrence.
N. P. Neilson, 1906, architect, Topeka.
A. M. Nissen, A. M., 1901, farmer, Wetmore.
H. N. Olson, 1895, Bethany Coll., Lindsborg.
J. B. Parker, 1909, Agr. Coll., Manhattan.
Frank Patrick, 1903, microscopist, Kansas City, Mo.
Leslie F. Paull, B. S., 1903, Agr. Coll., Fort Collins, Neb.
Rev. P. B. Peabody, 1909, clergyman, (ornithologist), Blue Rapids.
L. M. Peace, A. B., 1904, Univ. of Kansas, Lawrence.
Arthur D. Pitcher, A. M., 1906, Univ. of Kansas, Lawrence.
L. M. Plairs, asst. entomologist, Agr. Coll., Manhattan.
L. M. Powell, M. D., 1906, physician, Topeka.
Silas Eber Price, D. D., president Ottawa Univ., Ottawa.
Charles Smith Prosser, D. Sc., Ph. D., 1892, educator and geologist, Columbus, Ohio.
Wm. S. Prout, M. D., 1904, Emmet, Kan.
D. L. Randall, Ph. D., 1911, professor of chemistry, Baldwin.
Albert B. Reagan, 1904, director of Indian school, Orr, Minn.
L. J. Reiser, 1911, chemist, Topeka.
Geo. E. Rex, 1911, mgr. treating plants, A. T. & S. F. Rly., Topeka.
H. A. Rice, C. E., 1909, asst. professor of engineering, Univ. of Kansas, Lawrence.
J. Risser, 1913, professor of zoölogy, Washburn Coll., Topeka.
B. R. Rogers, D. V., 1907, Agr. Coll., Manhattan.
Eulalia E. Roseberry, 1909, teacher of physiography, Pittsburg.
J. C. Russell, 1911, professor of agricultural chemistry, Univ. of Minnesota, Minneapolis, Minn.
Frank K. Sanders, D. D., Ph. D., LL. D., 1909, president Washburn Coll., Topeka.
D. C. Schaffner, 1903, Coll. of Emporia, Emporia.

John H. Schaffner, A. M., M. S., 1902, professor of botany, Univ. of Ohio, Columbus, Ohio.

Theo. S. Scheffer, M. S., 1903, Dept. Agriculture, Washington, D. C.

J. W. Scott, Ph. D., Agr. Coll., Manhattan.

M. Sebastian, 1911, Parochial School, Parsons.

Miriam Sheldon, A. M., 1906, Univ. of Kansas, Lawrence.

Edwin Taylor Shelly, M. D., 1902, physician, Atchison.

Claude J. Shirk, A. M., M. S., 1905, instructor in physics and chemistry, Ottawa.

J. A. G. Shirk, 1904, professor of physics, Pittsburg, Kan.

Eva Schley, A. B., 1903, natural history, Univ. of Chicago, Chicago, Ill.

Ralph C. Shuey, 1905, Univ. of Pittsburg, Pa.

S. G. Stewart, M. D., 1904, physician and surgeon, Topeka.

Chas. M. Sterling, A. B., 1904, Univ. of Kansas, Lawrence.

Frank Strong, LL. D., Ph. D., 1905, chancellor of University, Lawrence.

E. F. Stimpson, 1904, Univ. of Kansas, Lawrence.

M. C. Tanquary, Ph. D., 1912, instructor of entomology, Agr. Coll., Manhattan.

E. L. Tague, A. M., professor of chemistry, Washburn Coll., Topeka.

Edgar H. Thomas, 1907, State Normal School, Emporia.

F. J. Titt, B. S., 1898, Kingfisher Coll., Kingfisher, Okla.

J. E. Todd, A. M., 1907, professor of geology, Univ. of Kansas, Lawrence.

David Train, 1907, Bethany Coll., Lindsborg.

E. S. Tucker, 1904, associate professor of entomology, Dept. Agriculture, Baton Rouge, La.

W. H. Twenhofel, 1910, professor of geology and paleontology, Univ. of Kansas, Lawrence.

Edith M. Twiss, Ph. D., 1910, professor of botany, Washburn Coll., Topeka.

W. A. Van Voris, 1907, State Normal School, Emporia.

Henry L. Viereck, 1913, entomologist, Lawrence.

P. F. Walker, 1905, Univ. of Kansas, Lawrence.

J. D. Walters, M. S., 1894, Agr. Coll., Manhattan.

Laurance A. Walworth, 1913, taxidermist, Baldwin.

E. C. Warfel, A. M., 1909, lawyer, Topeka.

H. J. Waters, B. Sc., 1909, president Agr. Coll., Manhattan.

E. R. Weidlein, 1911, Univ. of Pittsburg, Pa.

J. E. Welin, A. M., M. S., 1899, professor of chemistry, Bethany Coll., Lindsborg.

Archie J. Weith, 1906, 636 W. Twenty-second st., Chicago, Ill.

J. B. Whelan, 1909, professor of chemistry, Univ. of Kansas, Lawrence.

E. A. White, 1909, chemist, Kansas City, Mo.

Stanley D. Wilson, B. A., 1910, instructor in chemistry, Univ. of Chicago, Chicago, Ill.

W. B. Wilson, B. S., M. S., 1903, professor of biology, Ottawa Univ., Ottawa.

C. H. Withington, B. S., 1903, high school, Topeka.

T. M. Wood, B. S., 1909, instructor, M. T. S., Pittsburg.

H. I. Woods, M. S., 1902, professor physics and astronomy, Washburn Coll, Topeka.

Lyman C. Wooster, Ph. D., 1897, State Normal School, Emporia.

J. A. Yates, M. S., 1897, geologist, M. T. S., Pittsburg.

C. C. Young, 1909, chemist State Water Survey, Lawrence.

II.

CHEMICAL AND PHYSICAL PAPERS.

1. "THE VALUE OF CORN OIL AS A SUBSTITUTE FOR OLIVE OIL AND COTTONSEED OIL."
By B. E. POOL and L. E. SAYRE.
2. "IMPROVEMENT IN THE COMMERCIAL SUPPLY OF SPICES AND CAUSE OF THE SAME."
By L. E. SAYRE.
3. "THE DEVELOPMENT OF MECHANICAL POWER IN THE LAST DECADE."
By F. E. SIBLEY.

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III.

GEOLOGICAL PAPERS.

1. "THE GEOLOGICAL DEVELOPMENT OF KANSAS."
By LYMAN C. WOOSTER.
2. "THE GLACIAL EPOCH."
By ALBERT B. REAGAN.
3. "LOWERING OF THE GROUND-WATER TABLE."
By W. A. COOK.

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IV.
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1. "ADDITIONS TO THE LIST OF KANSAS COLEOPTERA FOR 1910-'11-'12."
By W. KNAUS.

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V. MISCELLANEOUS PAPERS.

1. "PHENOMENA BEAUTIFUL."

By W. A. COOK.

2. "WITCHING FOR WATER AND OTHER THINGS."

By J. T. LOVEWELL.

3. "UNIVERSITY EXTENSION."

By DEWITT C. CROISSANT.

VI.
NECROLOGY.

1. ROBERT KENNEDY DUNCAN.
2. ALTON HOWARD THOMPSON.

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